

material in which at least one of refractive index or extinction coefficient is changed with irradiation of electron beams.

10. A recording medium according to claim 2, wherein said light transmission recording material is a light transmission recording material in which at least one of transmittance or reflectance is changed with irradiation of electron beams.

11. A recording medium according to claim 3, wherein said light transmission substrate or said light transmission substrate is a light transmission recording material in which at least one of refractive index or extinction coefficient is changed with irradiation of electron beams.

12. A recording medium according to claim 4, wherein said light transmission substrate or said light transmission protecting film is a light transmission recording material in which at least one of transmittance or reflectance is changed with irradiation of electron beams.

13. A recording medium according to claim 1 or 2, wherein said light transmission recording material is made of any one of resin substrates of polycarbonate resin, polyolefin resin, polymethyl methacrylate resin, epoxy resin and acrylic resin or glass substrate.

14. A recording medium according to claim 3 or 4, wherein

said light transmission recording material is made of any one of resin substrates of polycarbonate resin, polyolefin resin, polymethyl methacrylate resin, epoxy resin and acrylic resin or glass substrate.

15. A recording medium according to claim 3 or 4, wherein said light transmission protecting film is made of polycarbonate resin, polyolefin resin, polymethyl methacrylate resin, epoxy resin, ultraviolet-curing resin, thermosetting resin, photopolymer resin or sheet made of glass or a coated film.

16. A recording medium according to claim 1 or 2, wherein said information is information containing inherent identification information.

17. A recording medium according to claim 3 or 4, wherein said information B contains inherent identification information.

18. A recording medium according to claim 1 or 2, wherein said information contains at least one of numeral, character, image and bar code.

19. A recording medium according to claim 3 or 4, wherein said information B contains at least one of numeral, character, image and bar code.

20. A recording medium according to claim 1 or 2, wherein

of said information A and light having a reproducing wavelength λ_{pa} of said information A.

27. A recording medium according to claim 3 or 4, wherein said recording area of said information A is a recording area in which said information A is to be recorded with irradiation of light having a wavelength λ_{ra} and said information A is reproduced with irradiation of light having a wavelength λ_{pa} , said light transmission substrate or said light transmission protecting film is a light transmission substrate or a light transmission protecting film in which said information B is recorded with irradiation of light having a wavelength λ_{rb} and said information B is to be reproduced with irradiation of light having a wavelength λ_{pb} and said light transmission substrate or said light transmission protecting film has transmittance less than 50% relative to light having said wavelength λ_{rb} at which said information B is recorded.

28. A recording medium according to claim 3 or 4, wherein said recording area of said information A is a recording area in which said information A is to be recorded with irradiation of light having a wavelength λ_{ra} and said information A is to be reproduced with irradiation of light having a wavelength λ_{pa} , said light transmission substrate or said light transmission protecting film is a light transmission substrate or a light transmission protecting film in which

said information B is to be recorded with irradiation of light having a wavelength λ_{rb} and said information B is to be reproduced with irradiation of light having a wavelength λ_{pb} and said light transmission substrate or said light transmission protecting film has a transmittance of 50% or more relative to light having a wavelength λ_{pb} at which said information B is to be reproduced.

29. A recording medium according to claim 3 or 4, wherein said recording area of said information A is comprised of recording areas more than any one of a pit mark recording area, a dye recording area, a magnetic recording area, a magneto-optical recording area and a phase change recording area.

30. A recording area according to claim 3 or 4, wherein said recording area of said information A is comprised of a magneto-optical recording area and said magneto-optical recording area includes at least a reproducing layer and a recording layer.

31. A recording area according to claim 3 or 4, wherein said recording area of said information A is comprised of a magneto-optical recording area and said magneto-optical recording area is comprised of a magnetic super-resolution reproducing magneto-optical recording layer or a magnetic domain enlarging reproducing magneto-optical recording layer.

32. An optical recording medium according to claim 3 or 4,

$\neq \lambda_{rb}$.

34. A recording medium according to claim 1 or 2, wherein said recording area is a recording area in which information is to be recorded by at least any of a change of multi-value refractive index or a change of multi-value extinction coefficient or by at least any of a change of multi-value transmittance or a change of multi-value reflectance.

35. A recording medium according to claim 3 or 4, wherein said information B is to be recorded by at least any one of a change of multi-value refractive index or a change of multi-value extinction coefficient or by at least any one of a change of multi-value transmittance or multi-value reflectance.

36. A recording medium according to claim 1 or 2, wherein said recording area is a recording area in which information is to be recorded by a continuous change of multi-value refractive index or by a continuous change of multi-value extinction coefficient or by a continuous change of multi-value transmittance or by a continuous change of multi-value reflectance.

37. A recording medium according to claim 3 or 4, wherein said information B is to be recorded by at least any of a continuous change of multi-value refractive index or a continuous change of multi-value extinction coefficient or by at least any of a continuous

change of multi-value transmittance or a continuous change of multi-value reflectance.

38. A recording medium according to claim 1 or 2, wherein said recording area is a recording area in which information is to be recorded by at least any one of a change of multi-value refractive index or a change of multi-value extinction coefficient or a change of multi-value transmittance or a change of multi-value reflectance recorded by at least one of changes of ultraviolet ray irradiation time, ultraviolet ray irradiation time and ultraviolet ray irradiation light amount.

39. A recording medium according to claim 3 or 4, wherein said information B is to be recorded by at least any one of a change of multi-value refractive index or a change of multi-value extinction coefficient or a change of multi-value transmittance or a change of multi-value reflectance recorded by at least one of changes of ultraviolet ray irradiation time, ultraviolet ray irradiation time and ultraviolet ray irradiation light amount.

40. A recording medium according to claim 1 or 2, wherein said recording area is a recording area in which information is to be recorded by at least any one of a continuous change of multi-value refractive index or a continuous change of multi-value extinction coefficient or a continuous change of multi-value transmittance or a continuous change of multi-value reflectance recorded by at least

44. A recording and reproducing method for recording and reproducing information on and from a recording medium including a light transmission recording material and said light transmission recording material has a recording area in which information is to be recorded by at least one of a change of refractive index or a change of extinction coefficient said method comprising a step of irradiating light on said recording medium in order to record or reproduce said information.

45. A recording and reproducing method for recording and reproducing information on and from a recording medium including a light transmission recording material and said light transmission recording material has a recording area in which information is to be recorded by at least one of a change of transmittance or a change of reflectance, said method comprising a step of irradiating light on said recording medium in order to record or reproduce said information.

46. A recording and reproducing method for recording and reproducing information on and from a recording medium including at least one of a light transmission substrate and a light transmission protecting film and at least one of said light transmission substrate and said light transmission protecting film includes a recording area in which information B is to be recorded by at least one of a change of refractive index or a change of extinction coefficient, said method comprising a step of irradiating light on said recording medium in

44 or 45, wherein said recording medium is irradiated with ultraviolet rays in said light irradiation step.

53. A recording and reproducing method according to claim 46 or 47, wherein said recording medium is irradiated with ultraviolet rays in said light irradiation step.

54. A recording and reproducing method according to claim 44 or 45, wherein said light transmission recording material is irradiated with reproducing light and said information is reproduced by a change of light amount of passing light of said reproducing light or a change of light amount of reflected light of said reproducing light in said light irradiation step.

55. A recording and reproducing method according to claim 46 or 47, wherein said light transmission recording material is irradiated with reproducing light and said information B is reproduced by a change of light amount of passing light of reproducing light or a change of light amount of reflected light in said light irradiation step.

56. A recording and reproducing method according to claim 46 or 47, wherein said information A is recorded with irradiation of light having a wavelength λ_{ra} and said information A is reproduced with light having a wavelength λ_{pb} in said light irradiation step,

said information B is recorded with irradiation of light having a wavelength λ_{rb} and said information B is reproduced with irradiation of light having a wavelength λ_{pb} in said light irradiation step and said λ_{ra} , λ_{pa} , λ_{rb} , λ_{pb} satisfy more than any one of relationship of $\lambda_{ra} = \lambda_{pa}$, $\lambda_{ra} \neq \lambda_{pa}$, $\lambda_{rb} = \lambda_{pb}$, $\lambda_{rb} \neq \lambda_{pb}$, $\lambda_{ra} = \lambda_{rb}$, $\lambda_{ra} \neq \lambda_{rb}$, $\lambda_{pa} = \lambda_{pb}$, $\lambda_{pa} \neq \lambda_{pb}$, $\lambda_{ra} = \lambda_{pb}$, $\lambda_{ra} \neq \lambda_{pb}$, $\lambda_{pa} = \lambda_{rb}$, $\lambda_{pa} \neq \lambda_{rb}$.

57. A recording and reproducing method according to claim 46 or 47, wherein said recording medium has a recording area of said information A in which said information A is reproduced with irradiation of light having a wavelength λ_{pa} and said information A is reproduced without irradiation of light, said information B is recorded on said light transmission substrate or said light transmission protecting film with irradiation of light having a wavelength λ_{rb} and said information B is reproduced from said light transmission substrate or said light transmission protecting film with irradiation of light having a wavelength λ_{pb} in said light irradiation step and said λ_{pa} , λ_{rb} , λ_{pb} satisfy more than any one relationship of $\lambda_{rb} = \lambda_{pb}$, $\lambda_{rb} \neq \lambda_{pb}$, $\lambda_{pa} = \lambda_{pb}$, $\lambda_{pa} \neq \lambda_{pb}$, $\lambda_{pa} = \lambda_{rb}$, $\lambda_{pa} \neq \lambda_{rb}$.

58. A recording and reproducing method according to claim 46 or 47, wherein said light irradiation step includes a step of reproducing information B and a step of recording or reproducing information A based on reproducing information of said information

B.

59. A recording and reproducing method according to claim 46 or 47, wherein said information B contains inherent identification information and said light irradiation step includes a step of recording or reproducing information A based on reproducing information of said inherent identification information of said information B.

60. A recording and reproducing method according to claim 46 or 47, wherein said information B contains inherent identification information, said inherent identification information contains at least one of management information of recording medium, management information of recording information, recording disapproving information, reproduction disapproving information, true and false information of recording medium, recording number limiting information, reproduction number limiting information and user authentication information and said light irradiation step includes a step of recording or reproducing information A based on reproducing information of said inherent identification information of said information B.

61. A recording and reproducing method according to claim 46 or 47, wherein said recording area of said information A includes information relating to said information B and said light irradiation step includes a step of reproducing information relating to said information B of said information A, a step of reproducing said information B based on information relating to said information B and a step of recording or reproducing said information A by judgment based

on reproduced information of said information B.

62. A recording and reproducing method according to claim 44 or 45, wherein said light irradiation step includes a step of recording said information as information based on at least any one of a change of multi-value refractive index or a change of multi-value extinction coefficient or at least one of a change of multi-value transmittance or a change of multi-value reflectance by at least one of a change of ultraviolet ray irradiation time, ultraviolet ray irradiation intensity and light amount of irradiated ultraviolet rays.

63. A recording and reproducing method according to claim 46 or 47, wherein said light irradiation step includes a step of recording said information B as information based on at least any one of a change of multi-value refractive index or a change of multi-value extinction coefficient or at least any one of a change of multi-value transmittance or a change of multi-value reflectance by at least a change of ultraviolet ray irradiation time, ultraviolet ray irradiation intensity and light amount of irradiated ultraviolet rays.

64. A recording and reproducing method according to claim 44 or 45, wherein said light irradiation step includes a step of reproducing information B by at least any one of a change of multi-value refractive index or a change of multi-value extinction coefficient or by at least any one of a change of multi-value transmittance or a change of multi-value reflectance and said

reproducing step detects a change of multi-value light amount of passing light or a change of multi-value reflected light of reproducing light irradiated on said recording medium.

65. A recording and reproducing method according to claim 46 or 47, wherein said light irradiation step includes a step of reproducing information B by at least any one of a change of multi-value refractive index or a change of multi-value extinction coefficient or by at least any one of a change of multi-value transmittance or a change of multi-value reflectance and a change of multi-value light amount of passing light or a change of multi-value light amount of reflected light of reproducing light irradiated on said recording medium by said reproducing step.

66. A recording and reproducing method according to claim 44 or 45, wherein said light irradiation step includes a step of recording said information as information based on at least any one of a continuous change of multi-value refractive index or a continuous change of multi-value extinction coefficient or at least any one of a continuous change of multi-value transmittance or a continuous change of multi-value reflectance by at least one change of ultraviolet ray irradiation time, ultraviolet ray irradiation intensity and ultraviolet ray irradiation light amount.

67. A recording and reproducing method according to claim 46 or 47, wherein said light irradiation step includes a step of

recording said information B as information based on at least any one of a continuous change of multi-value refractive index or a continuous change of multi-value extinction coefficient or at least any one of a continuous change of multi-value transmittance or a continuous change of multi-value reflectance by at least one change of ultraviolet ray irradiation time, ultraviolet ray irradiation intensity and ultraviolet ray irradiation light amount.

68. A recording and reproducing method according to claim 44 or 45, wherein said light irradiation step includes a step of reproducing information by at least any one of a continuous change of multi-value refractive index or a continuous change of multi-value extinction coefficient or by at least any one of a continuous change of multi-value transmittance or a continuous change of multi-value reflectance and continuous change of multi-value light amount of passing light or a continuous change of multi-value light amount of reflected light of reproducing light irradiated on said recording medium is detected by said reproducing step.

69. A recording and reproducing method according to claim 46 or 47, wherein said light irradiation step includes a step of reproducing information B by at least any one of a continuous change of multi-value refractive index or a continuous change of multi-value extinction coefficient or at least any one of a continuous change of multi-value transmittance or a continuous change of multi-value reflectance and a continuous change of multi-value light amount of

passing light or a continuous change of multi-value light amount of reflected light of reproducing light irradiated on said recording medium is detected by said reproducing step.

70. A recording and reproducing apparatus including light irradiating means for recording or reproducing information by irradiating light on a recording medium including a light transmission recording material and said light transmission recording material including a recording area in which said information is to be recorded or reproduced by at least any one of a change of refractive index or a change of extinction coefficient.

71. A recording and reproducing apparatus including light irradiating means for recording or reproducing information by irradiating light on a recording medium including a light transmission recording material and said light transmission recording material includes a recording area in which information is to be recorded by at least any one of a change of transmittance or a change of reflectance.

72. A recording and reproducing apparatus including light irradiating means for recording or reproducing at least information B by irradiating light on a recording medium including at least any one of a light transmission substrate and a light transmission protecting film and a recording area of information A and at least one of said light transmission substrate or said light transmission protecting film includes a recording area in which said information B is to be

recorded by at least any one of a change of refractive index or a change of extinction coefficient.

73. A recording and reproducing apparatus including light irradiating means for recording or reproducing at least information B by irradiating light on a recording medium including at least one of a light transmission substrate and a light transmission protecting film and a recording area of information A and at least one of said light transmission substrate or said light transmission protecting film includes a recording area in which said information B is to be recorded by at least one of a change of transmittance or a change of reflectance.

74. A recording and reproducing apparatus including an electron beam irradiating section for recording information by irradiating electron beams on a recording medium including a light transmission recording material and said light transmission recording material includes a recording area in which said information is to be recorded by at least any one of a change of refractive index or a change of extinction coefficient.

75. A recording and reproducing apparatus including an electron beam irradiating section for recording information by irradiating electron beams on a recording medium including a light transmission recording material and said light transmission recording material includes a recording area in which said information is to be recorded

by at least any one of a change of transmittance or a change of reflectance.

76. A recording and reproducing apparatus including an electron beam irradiating section for recording at least information B by irradiating electron beams on a recording medium including at least one of a light transmission substrate and a light transmission protecting film and a recording area of information A and at least one of said light transmission substrate or said light transmission protecting film includes a recording area in which said information B is to be recorded by at least one of a change of refractive index or a change of extinction coefficient.

77. A recording and reproducing apparatus including an electron beam irradiating section for recording at least information B by irradiating electron beams on a recording medium including at least one of a light transmission substrate and a light transmission protecting film and at least one of said light transmission substrate or said light transmission protecting film includes a recording area in which said information B is to be recorded by at least one of a change of transmittance or a change of reflectance.

78. A recording and reproducing apparatus according to claim 70, 71, 72 or 73, wherein said light irradiating means records information by changing at least any one of light intensity, light amount, irradiation pattern and irradiation time in response to recording information.

79. A recording and reproducing apparatus according to claim 70, 71, 72 or 73, further comprising:

photo-detecting means for detecting a change of light amount of light passing through said recording medium or a change of light amount of light reflected on said recording medium from reproduced light from said light irradiating means; and

means for reproducing information based on an output signal from said photo-detecting means.

80. A recording and reproducing apparatus according to claim 70, 71, 72 or 73, wherein said light irradiating means includes a ultraviolet ray generating light source for irradiating recording light or reproducing light based on ultraviolet rays on said recording medium in order to record or reproduce information.

81. A recording and reproducing apparatus according to claim 70, 71, 72 or 73, wherein said light irradiating means includes a ultraviolet ray generating light source and said ultraviolet ray generating light source includes a ultraviolet ray laser or ultraviolet ray lamp.

82. A recording and reproducing apparatus according to claim 70, 71, 72 or 73, wherein said light irradiating means includes a ultraviolet ray lamp and a light transmission pattern for passing ultraviolet rays corresponding to recording information.

83. A recording and reproducing apparatus according to claim 72 or 73, further comprising recording and reproducing means for recording said information A by irradiating light having a wavelength λ_{ra} and reproducing said information A by irradiating light having a wavelength λ_{pa} and recording said information B by irradiating light having a wavelength λ_{rb} and reproducing said information B by irradiating light having a wavelength λ_{pb} and said λ_{ra} , λ_{pa} , λ_{rb} , λ_{pb} satisfy more than any one of relationship of $\lambda_{ra} = \lambda_{pa}$, $\lambda_{ra} \neq \lambda_{pa}$, $\lambda_{rb} = \lambda_{pb}$, $\lambda_{rb} \neq \lambda_{pb}$, $\lambda_{ra} = \lambda_{rb}$, $\lambda_{ra} \neq \lambda_{rb}$, $\lambda_{pa} = \lambda_{pb}$, $\lambda_{pa} \neq \lambda_{pb}$, $\lambda_{ra} = \lambda_{pb}$, $\lambda_{ra} \neq \lambda_{pb}$, $\lambda_{pa} = \lambda_{rb}$, $\lambda_{pa} \neq \lambda_{rb}$.

84. A recording and reproducing apparatus according to claim 72 or 73, further comprising recording and reproducing means for reproducing information A by irradiation of light having a wavelength λ_{pa} or reproducing information A without irradiation of light, recording information B by irradiation of light having a wavelength λ_{rb} and reproducing information B by irradiation of light having a wavelength λ_{pb} and said λ_{pa} , λ_{rb} , λ_{pb} satisfy more than any one relationship of $\lambda_{rb} = \lambda_{pb}$, $\lambda_{rb} \neq \lambda_{pb}$, $\lambda_{pa} = \lambda_{pb}$, $\lambda_{pa} \neq \lambda_{pb}$, $\lambda_{pa} = \lambda_{rb}$, $\lambda_{pa} \neq \lambda_{rb}$.

85. A recording and reproducing apparatus according to claim 70, 71, 72 or 73, wherein said light irradiation means records part of or whole of said information as information based on at least one change of multi-value refractive index or at least one change of

multi-value extinction coefficient or at least one change of multi-value transmittance or at least one change of multi-value reflectance by at least one of ultraviolet ray irradiation time, ultraviolet ray irradiation intensity and ultraviolet ray irradiation light amount.

86. A recording and reproducing apparatus according to claim 83 or 84, wherein said wavelength λ_{ra} , λ_{pa} , λ_{rb} , λ_{pb} satisfy equalities and inequalities of $300 \text{ nm} \leq \lambda_{ra}$ and $\lambda_{pa} \leq 900 \text{ nm}$ or equalities and inequalities of $100 \text{ nm} \leq \lambda_{rb}$ and $\lambda_{pb} \leq 500 \text{ nm}$.

87. A recording and reproducing apparatus according to claim 70, 71, 72 or 73, wherein said light irradiating means records part of or whole of said information as information based on at least any one of a continuous change of multi-value refractive index or a continuous change of multi-value extinction coefficient or at least any one of a continuous change of multi-value transmittance or a continuous change of multi-value reflectance by at least one change of ultraviolet ray irradiation time, ultraviolet ray irradiation intensity and ultraviolet ray irradiation light amount.

88. A recording and reproducing apparatus according to claim 70, 71, 72 or 73, wherein said light irradiating means records part of or whole of said information as information based on at least any one of a change of multi-value refractive index or a change of multi-value extinction coefficient or at least any one of a change of multi-value

transmittance or a change of multi-value reflectance by at least one change of ultraviolet ray irradiation time, ultraviolet ray irradiation intensity and ultraviolet ray irradiation light amount and detects said multi-value recorded information as a change of multi-value light amount of passing light of reproduced light or a change of multi-value light amount of reflected light.

89. A recording and reproducing apparatus according to claim 70, 71, 72 or 73, wherein said light irradiating means records part of or whole of said information as information based on at least any one of a continuous change of multi-value refractive index or a continuous change of multi-value extinction coefficient or at least any one of a continuous change of multi-value transmittance or a continuous change of multi-value reflectance by at least one change of ultraviolet ray irradiation time, ultraviolet ray irradiation intensity and ultraviolet ray irradiation light amount and detects said multi-value recorded information as a continuous change of multi-value light amount of passing light of reproduced light or a continuous change of multi-value light amount of reflected light.

90. A recording and reproducing apparatus according to claim 79, wherein said photo-detecting means is a solid-state image pickup device.

91. A recording and reproducing apparatus according to claim 79, wherein said photo-detecting means is a photo-detector.

92. A recording and reproducing apparatus according to claim 70, 71, 72 or 73, wherein said light irradiating means includes an objective lens and said objective lens outputs focusing and tracking servo signals by focusing ultraviolet ray laser light on said recording medium.

93. A recording and reproducing apparatus according to claim 72 or 73, wherein said light irradiating means includes a light source section for generating recording and reproducing light of said information A and a light source section for generating recording and reproducing light of said information B and said recording and reproducing light of said information A and said recording and reproducing light of said information B have wavelengths different from each other.

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